

1 **Supplementary Information**

2 **Dynamic fingerprinting of sub-cellular nanostructures by image mean square displacement**
3 **analysis**

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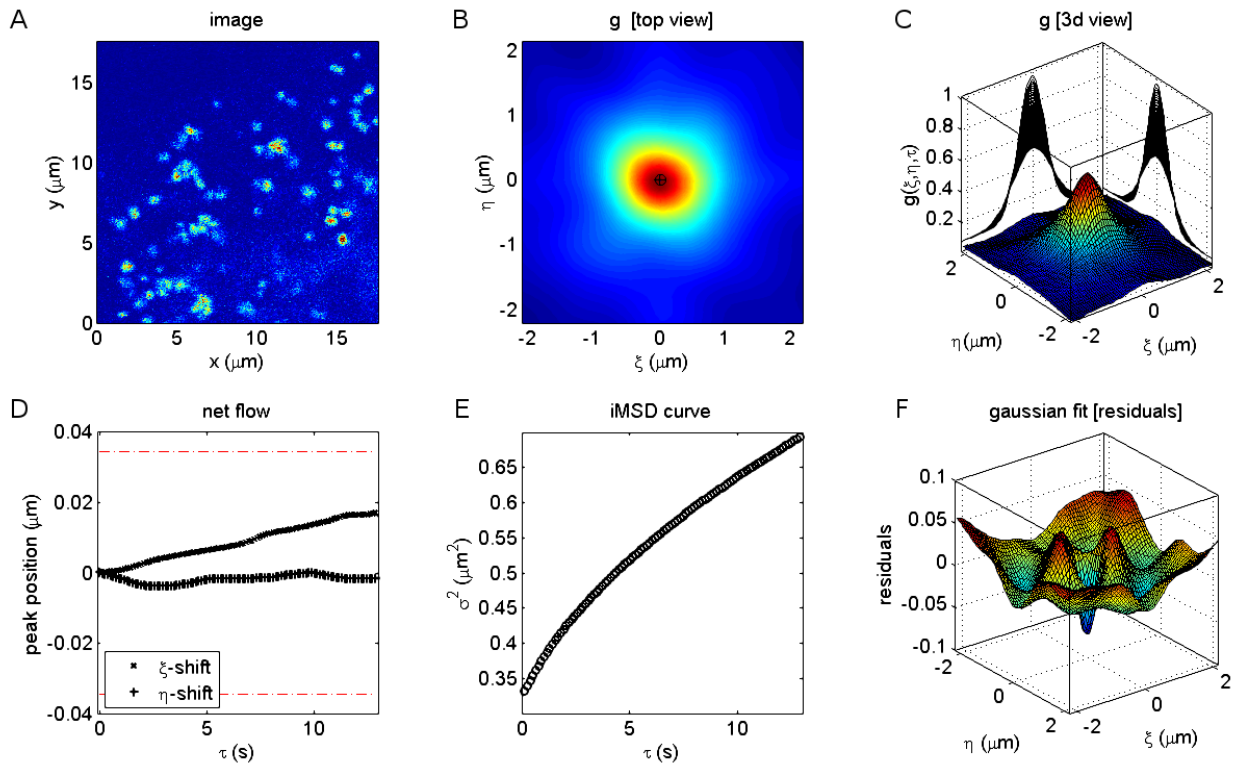
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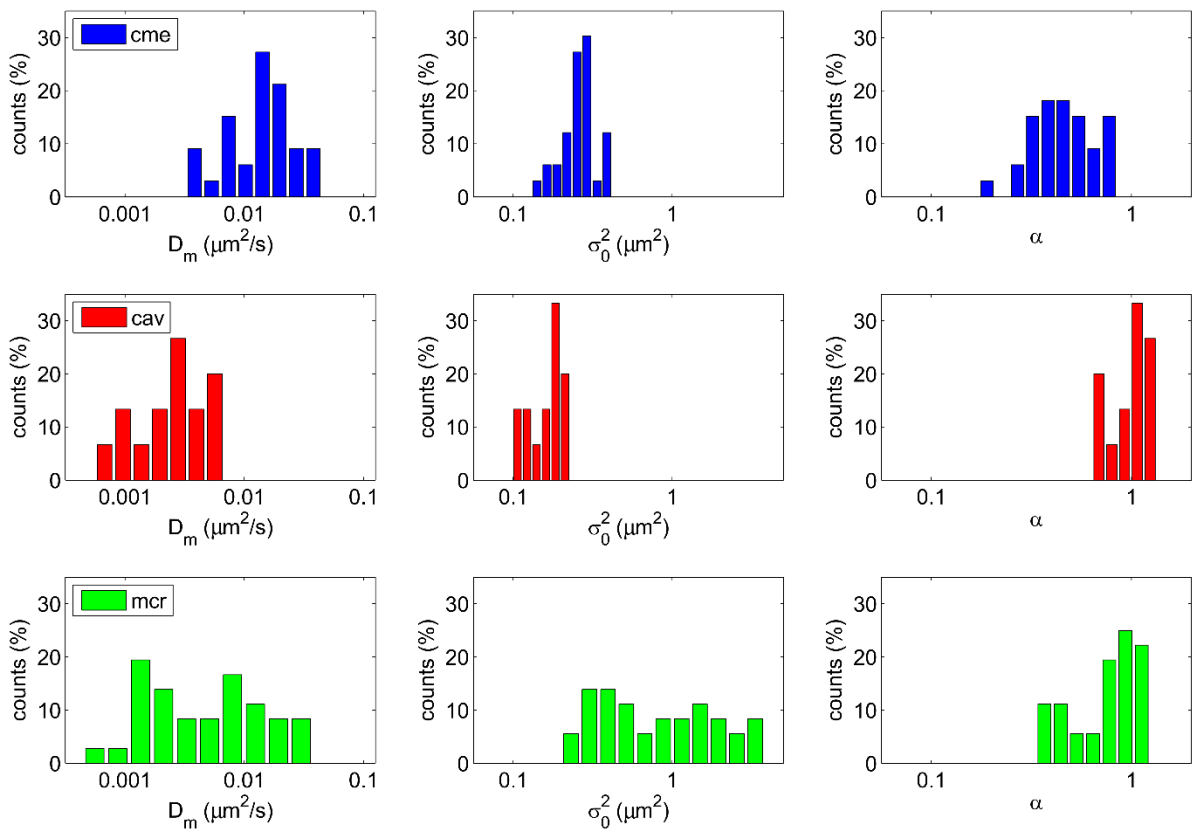
14 **Supplementary Figures**



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16 **Supplementary Figure 1** A) Representative image from the time-lapse B) Top view of the
 17 calculated spatiotemporal correlation function C) 3D view of the spatiotemporal correlation
 18 function, with projections D) Net movement of the peak of the spatiotemporal correlation function
 19 E) *i*MSD trace F) Gaussian fit residuals

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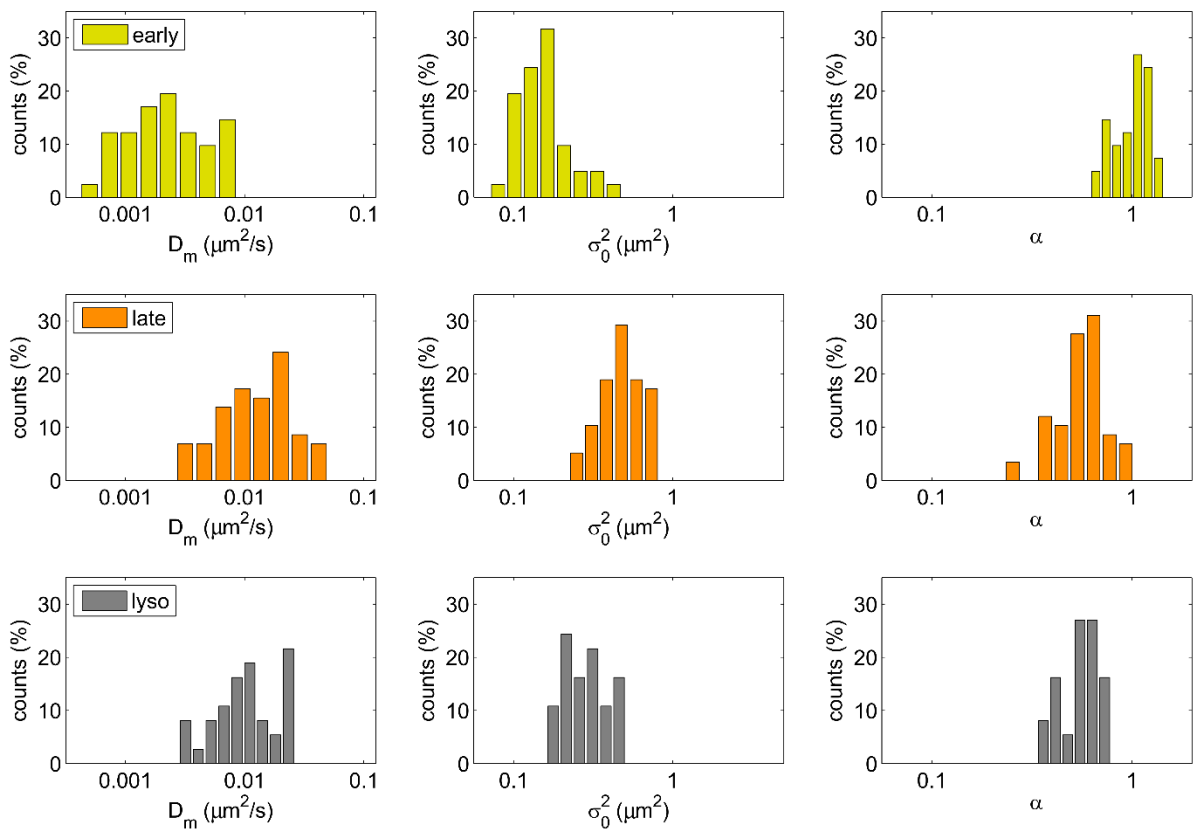


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22 **Supplementary Figure 2** Distributions of D_m , σ_0^2 , and α values for clathrin-mediated endocytosis

23 (first row, blue), caveolae (second row, red), and early micropinocytosis (third row, green)

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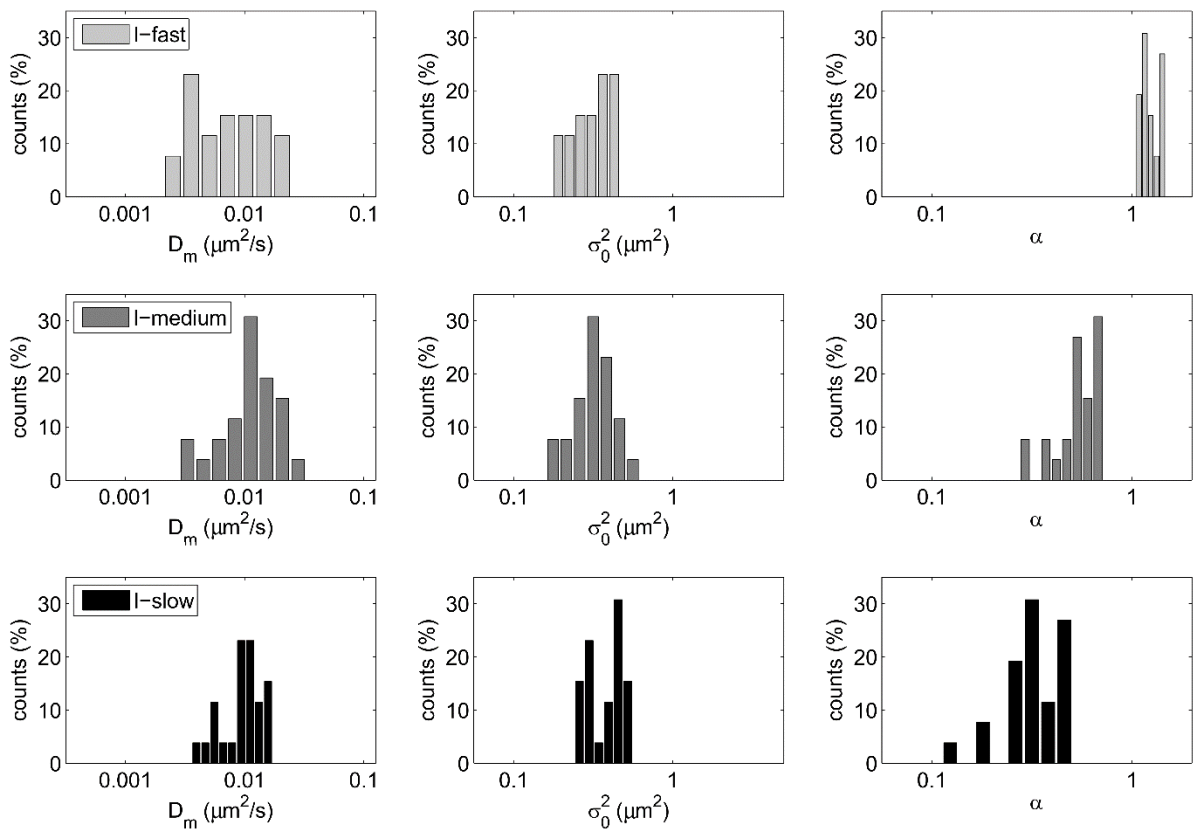


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26 **Supplementary Figure 3** Distributions of D_m , σ_0^2 , and α values for early endosomes (first row,
 27 dark yellow), late endosomes (second row, orange), and lysosomes (third row, grey)

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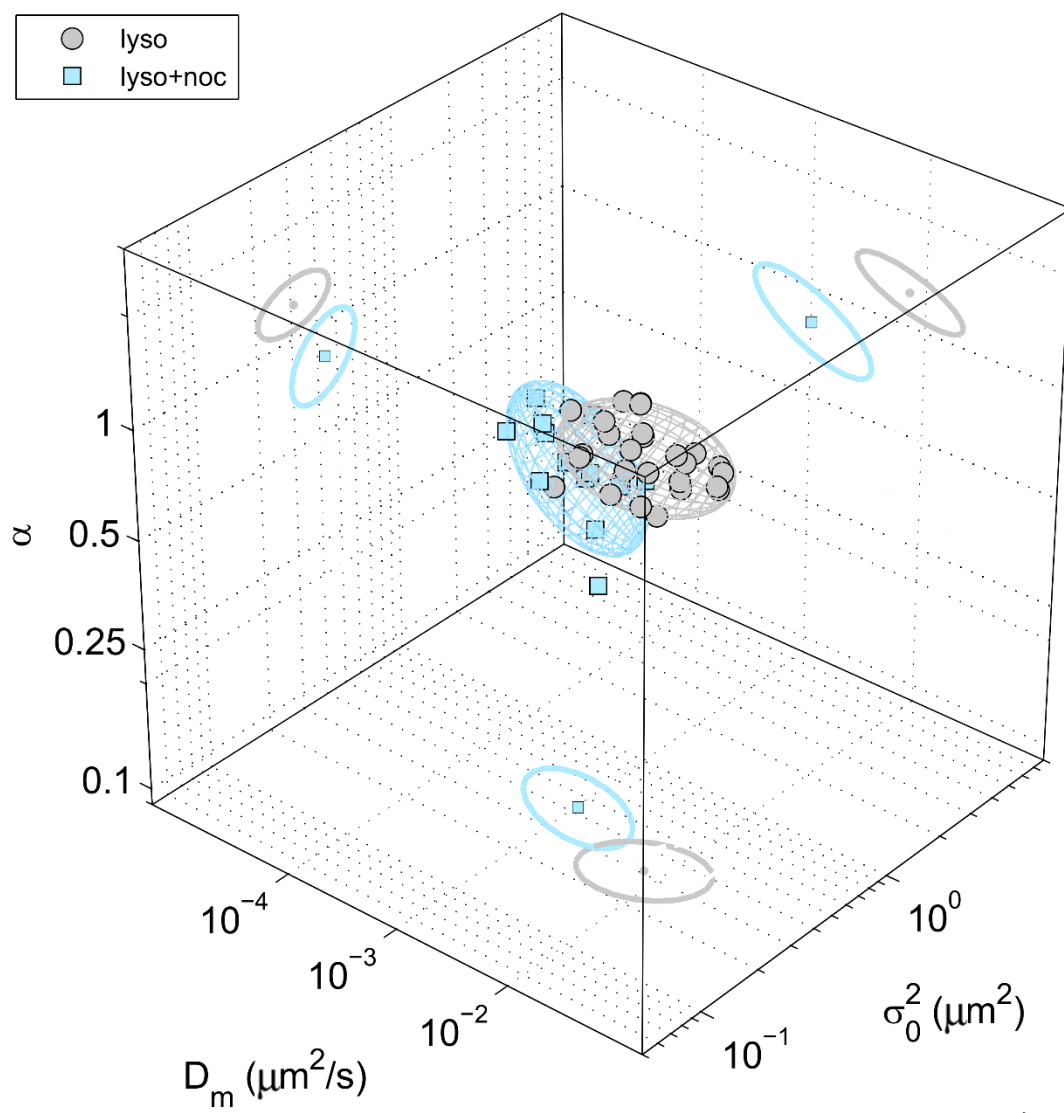


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31 **Supplementary Figure 4** Distributions of D_m , σ_0^2 , and α values for lysosomes in the 0-6 sec time
 32 window (first row, light grey), 0-12 sec time window (second row, dark grey), and 0-60 sec time
 33 window (third row, black)

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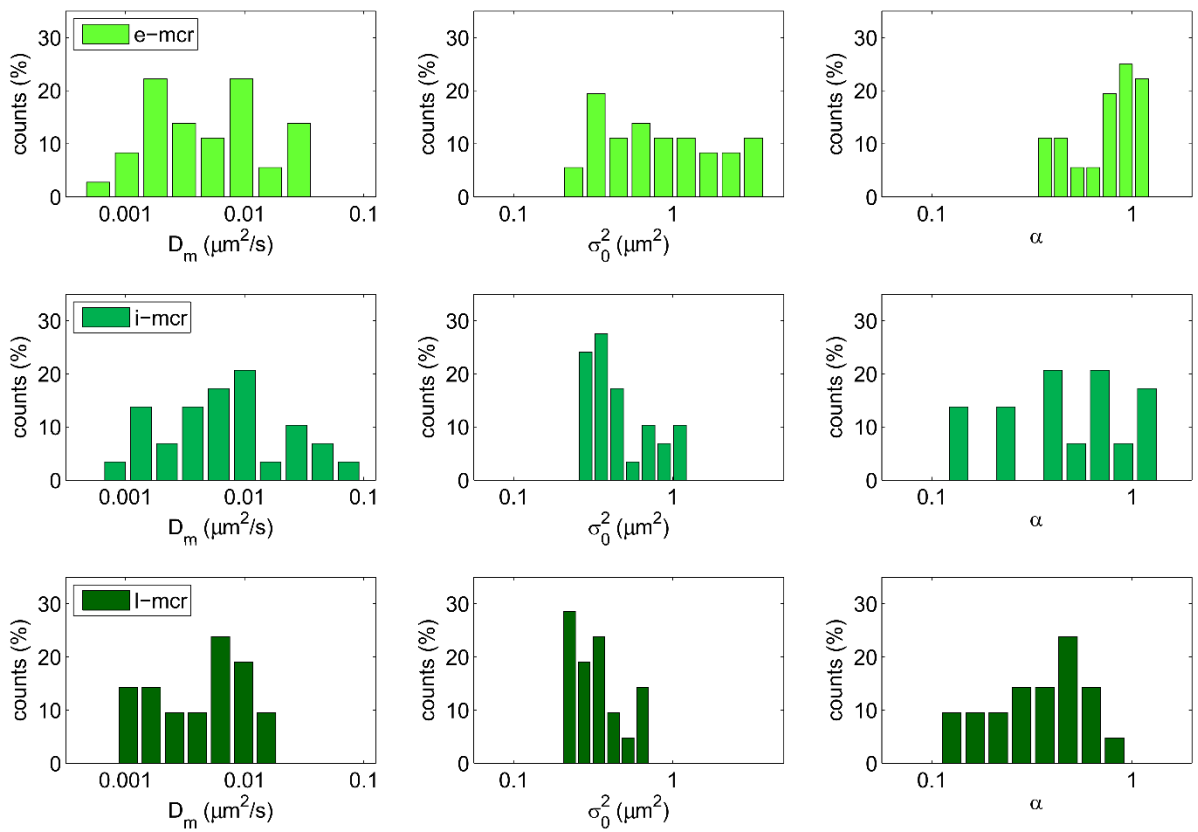


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37 **Supplementary Figure 5** 3D plot of experimental data points for lysosomes treated with

38 Nocodazole (cyan), as compared to the control (grey).

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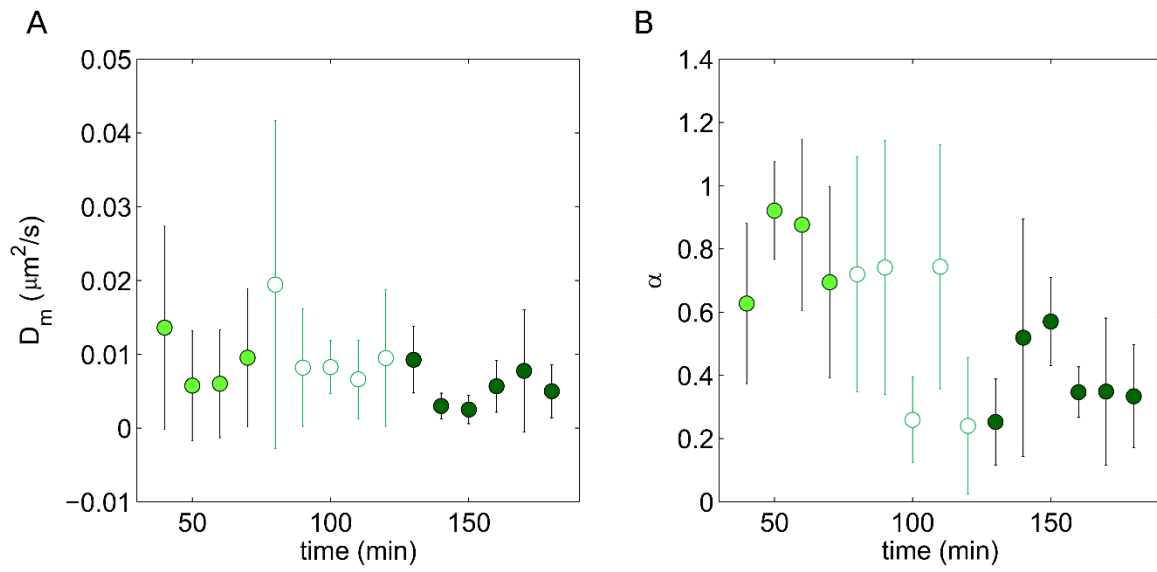


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41 **Supplementary Figure 6** Distributions of D_m , σ_0^2 , and α values for macropinosomes at different
 42 stages of trafficking, namely: early (30-70 min; first row, light green), intermediate (80-120 min;
 43 second row, green), and late (>120 min, third row, dark green)

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47 **Supplementary Figure 7** A) Statistics on the average local diffusivity (D_m) of macropinosomes

48 observed at the different time points. B) Statistics on the average anomalous coefficient (α) of

49 macropinosomes observed at the different time points.

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